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PATENT AND TECHNICAL TRANSLATION

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DECLARATION

The undersigned, Olaf Bexhoeft, hereby states that he is well acquainted with both the English and German languages and that the attached is a true translation to the best of his knowledge and ability of the German text of PCT/EP2005/004057, filed 04/16/2005, and published on 01/05/2006 as WO 2006/000270 A1.

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.

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Tool Holder

The invention relates to a tool holder arrangement with a chisel holder, which has a chisel receiver in a holding neck for receiving a chisel, which can be exchangeably received therein, wherein the chisel receiver is embodied in the shape of a bore and has a chisel insertion opening, wherein the chisel holder has a fastening side with a fastening neck and, facing away from the fastening side, an exterior, and wherein in the course of the tool operation centrifugal forces act in the direction from the fastening side to the exterior.

Such an arrangement is known from DE 43 22 401 C2. Such tool holder arrangements are employed in connection with road milling machines, ground stabilizers, mining machinery or the like, for example.

Customarily, the chisel holder is here attached to the surface of a milling roller by means of a base element. The chisel holder is used for the exchangeable reception of a chisel in the chisel receiver. Here, the chisel is maintained with play in the chisel receiver, mainly with the aid of a clamping sleeve. It is then maintained secure against loss, but freely rotatable around its center axis. In the course of the tool operation, the chisel wears down the surface to be processed, for example a road surface, with its chisel tip. The material of the surface is cut into pieces in the process. Coarse and fine surface particles are created. These are removed from the area of the milling roller. The fine particles can penetrate into the area of the chisel receiver. They become stuck there and hamper the free rotatability of the chisel. Occasionally they stop the

chisel completely. The reduced rotating capability leads to a rapid wear of the chisel. If this is not recognized in time, the chisel holder is also damaged. This then requires a cost-intensive exchange step.

It can furthermore become disadvantageous that the fine particle material which penetrated into the chisel receiver hampers the exchange of the chisel in the chisel holder.

It is the object of the invention to create a tool holder arrangement of the type mentioned at the outset, wherein the stoppage of the chisel because of removed material which penetrated the chisel receiver is prevented.

This object is attained in that the holding neck has an opening penetrating the interior wall of the chisel receiver and creating a spatial connection with the surroundings, and that the opening opens the chisel receiver in the direction toward the exterior.

The removed material carried into the area of the chisel receiver is transported by the rotating chisel along the longitudinal axis of the chisel in the direction facing away from the chisel head. A "pump action" is created by this, which is aided by the periodic tool engagement. In accordance with the invention, the chisel holder now has an opening in the area of the chisel receiver. It is arranged on the side of the centrifugal force. When the removed material is conveyed into the chisel receiver, it reaches the area of the opening and can again escape into the surroundings. The free rotatability of the chisel is maintained in this way.

It can be provided in accordance with a possible variation of the invention that the chisel receiver is embodied as a through-bore and has an expulsion opening

facing away from the chisel insertion opening, and that the opening opens the chisel receiver in the area of the expulsion opening and extends, starting at the expulsion opening, in the direction of the chisel insertion opening. An extensive accessibility to the chisel receiver is offered to the user, which permits a rapid and simple chisel removal.

In accordance with a preferred embodiment variation of the invention it is provided that a chisel shaft of a chisel is inserted into the chisel receiver, and that the opening is arranged at least in the area of the chisel receiver assigned to the shaft end. With this arrangement use is made of the realization that the carried-in removed material is transported in the direction of the chisel axis toward the free end of the chisel shaft. Now, since the opening is arranged in the area of the shaft end of the chisel, the material being collected here can easily reach the surroundings.

In this case the opening can be arranged up close to the shaft end, at the shaft end, or partially extending over the shaft end.

The opening can be easily made if it is provided that it is designed as a slit-shaped cutout, which has two delimitation faces extending parallel in respect to each other in the direction of the longitudinal axis of the chisel receiver, wherein the delimitation faces are at a distance from each other which is less than or equal to the bore diameter of the chisel receiver, or that the delimitation faces extend at an angle in relation to each other and define an angle of less than 180°. If it is provided that the opening takes up a portion of the interior wall of the chisel receiver extending over less than 180° of the circumference

of the bore-shaped chisel receiver, the support function of the chisel receiver for the inserted chisel shaft is only slightly diminished.

The accessibility of the chisel receiver for a disassembly tool is further improved if it is provided that the chisel holder is fastened on a base element, that the base element has a cutout which provides access for a disassembly tool to the expulsion opening of the chisel receiver, and that the cutout makes a transition into the opening.

A tool holder arrangement in accordance with the invention can be such that at least one liquid spray device is assigned to the chisel holder, which introduces liquid into the chisel receiver through the opening. Then the liquid dissolves the removed material collecting in the chisel receiver, so that it can be easily removed through the opening.

This takes place particularly effectively if it is provided that the liquid spray device applies a jet of liquid to the free end of the chisel shaft.

The invention will be explained in greater detail in what follows by means of an exemplary embodiment represented in the drawings. Shown are in:

Fig. 1, a tool holder arrangement with a chisel, a chisel holder and a base element in a lateral view and in section,

Fig. 2, the chisel holder represented in Fig. 1 in a perspective rear view, and

Fig. 3, the chisel holder in accordance with Fig. 2 in various plan views.

A tool holder arrangement having a base element 40 is

represented in Fig. 1. It can be fastened, for example welded, to the curved surface of a milling roller (not represented) by means of a fastening surface 41. The base element 40 has a plug-in receiver 42, into which a fastening neck 11 of a chisel holder 10 has been inserted. The fastening neck 11 has a depression 13 with a pressure face 13.1. The pressure face 13.1 is acted upon by a pressure screw 46, which has been screwed into an interior thread of the base element 40. The pressure screw 48 is accessible for a screwing tool through a tool opening 45.

The pressure screw 46 acts on the pressure face 13.1 in such a way that the fastening neck 11 is drawn into the plug-in receiver 42. In the process, guide faces 12 arranged in a prism-shape on the front are pressed against correspondingly embodied counter-faces of the base element 40.

The structure of the chisel holder 10 can be seen in greater detail in Figs. 2 and 3. As these representations show, the chisel holder 10 has a holding neck 15 adjoining the fastening neck 11. It forms a rear support face 14 which, in the mounted state, is seated on a counter-face 43 of the base element 40. The holding neck 15 has a cylindrical neck 16, into which wear markings, designed as encircling depressions, have been cut in the form of grooves. The cylindrical neck 16 terminates with a support surface 18. A chisel receiver 20 has been cut through the support surface 18 into the chisel receiver 20. The chisel receiver 20 is embodied as a cylindrical through-bore. In the area of the support surface 18 it forms a chisel insertion opening 24, and facing away from it an expulsion opening 21.

An opening 22 has been cut into the holding neck 15. It creates a spatial connection between the surroundings and

the chisel receiver 20. Here, the opening 22 opens the chisel receiver 20 in the direction toward the centrifugal force side of the chisel holder 10. This can be clearly seen in Fig. 1. The chisel holder 10 has a fastening side facing the base element 10, and the centrifugal force side facing away from the latter.

When the tool is used, the milling roller, and with it the tool holder arrangement, is rotated in the direction of the arrow "A" indicated in Fig. 1.

Centrifugal forces are created in the course of this, which act, directed radially outward, in the direction of the centrifugal force side of the chisel holder 10.

As can be further seen in Fig. 1, a chisel 30 has been placed into the chisel receiver 20 of the chisel holder 10. The chisel 30 has a cylindrical chisel shaft 31, on which a chisel head 32 has been formed in one piece. In a known manner, a wear protection disk 35 has been pushed on the chisel shaft 31. It is embodied in a circular manner and completely covers the support surface 18 of the chisel holder 10. On the side facing away from the support surface 18, the chisel head 32 is supported centered on the wear protection disk 35. A longitudinally-slit clamping sleeve 34 has been pushed on the chisel shaft 31. It has holding elements 34.1, which engage an encircling groove of the chisel shaft 31 for forming a rotary seating. Thus the chisel 30 is maintained freely rotatable in the clamping sleeve, but axially secure against being lost.

In the course of removing chips, removed fine material can reach the area of the chisel receiver 22. It gains access to the area between the chisel head 32 and the wear protection disk 35, or between the wear protection disk 35

and the support surface 18 of the chisel holder 10. It reaches the chisel receiver 35 over these paths, and in the present case the area between the chisel shaft 31 and the clamping sleeve 34. A pumping effect is created as a result of the rotary movement and of a slight limited axial play of the chisel shaft 31 in the clamping sleeve. This conveys the removed material in the direction toward the free end of the chisel shaft 31. The removed material then often forms a sticky suspension if a coolant, for example water, is employed in the removal process. As a result of the pumping effect, the removed material is conveyed along the chisel axis from the chisel insertion opening in the direction of the expulsion opening, and therefore against the direction of the centrifugal force, until it exits at the free end of the chisel shaft 31 from the intermediate area between the chisel shaft 31 and the clamping sleeve 34. The centrifugal forces acting on the removed material collecting here now move it through the opening 22 out of the chisel receiver 20.

Here use is made of the particularity that this area is in the "shadows" in respect to the direction of rotation of the roller, i.e. in the area of a clear surface of the chisel 30 and the chisel holder 10. Removal in the direction of rotation or laterally is not possible because of the circumstances at the milling roller, which customarily is enclosed by a hood, since here the path is blocked by the milled material, or by the surface to be removed.

As Fig. 1 clearly shows, the opening 22 extends some distance past the free end of the clamping sleeve 34, and therefore also of the chisel shaft 31. Because of this the removal process can take place dependably. This would also be the case if the opening 22 terminates with the free end of

the clamping sleeve 34 of the chisel shaft 31 or is arranged offset for some distance.

The opening 22 is in spatial connection with a rear cutout 44 of the base element 40.

A generous access to the free end of the chisel shaft 31 is created by this. This makes the application of a disassembly tool to the visible end of the chisel shaft 31 easier. It can then be easily pushed through the removal opening 43 into the chisel receiver 20.

The invention is of course not limited to the described exemplary embodiment. For example, it is also conceivable to use a clamping sleeve 34 which does not cover the entire chisel shaft 31. Then the transport of the removed material takes place in the area between the inner wall of the chisel receiver 20 and the chisel shaft 31 which is not covered.